



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,027	06/28/2005	Yasushi Ichikawa	040356-0561	2306

22428 7590 12/10/2007  
FOLEY AND LARDNER LLP  
SUITE 500  
3000 K STREET NW  
WASHINGTON, DC 20007

EXAMINER

SEIFU, LESSANEWORK T

ART UNIT	PAPER NUMBER
----------	--------------

1797

MAIL DATE	DELIVERY MODE
-----------	---------------

12/10/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/541,027		ICHIKAWA, YASUSHI	
	<b>Examiner</b>		<b>Art Unit</b>	
	Lessanework T. Seifu		1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 17-24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/28/05</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 9 is objected to because of the following informalities: The term "any" in line 1 of the claim should be deleted to properly limit the previous claim. Appropriate correction is required.
2. Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitation recited in the claim is directed to an intended use of the apparatus in claim 1 which does not structurally further limit the apparatus claim.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heil et al. (US 5,874,051).

Regarding claims 1-8 and 10-12, Heil et al. disclose a carbon monoxide oxidizer comprising a mixing unit that mixes at least two kinds of gases as a mixed gas, wherein the mixing unit is a static mixing structure (see col. 3, lines 50-67 and claim 2). Heil et al. disclose that the static mixing structure can be the same as the support units used in their disclosure to support selective CO oxidation catalyst (see col. 6, lines 18-35) or porous plates or other devices that have the required properties (see col. 4, lines 2-11). Heil et al. disclose that the provision of the static mixing structure is to promote uniform distribution and mixing of the mixed gas stream (see col. 2, lines 49-58). Applicant's limitations to the shape and configuration of the static mixer recited in claim 1 are not patentable distinctions over the prior art, because it is within the level of ordinary skill in the art to provide a static mixing structure having any number of shapes and configurations effective in promoting uniformed distribution and mixing of gases for the apparatus of Heil et al, which the reference disclose as suitable for use in motor vehicles powered by fuel cells.

Regarding claim 9, Heil et al. disclose that the carbon monoxide oxidizer of their invention, which comprises a static mixing structure provided upstream of a reaction

chamber (see Fig. 1), further comprises a porous gas mixing structure provided at the bottom and top of the reaction chamber containing catalyst support units (see col. 6, lines 30-34). The above disclosure meets the limitation recited in claim 9.

Regarding claim 13, Heil et al. disclose that the carbon monoxide oxidizer of their invention comprises a carbon monoxide preferential oxidation catalyst carried on a porous body (see col. 3 lines 38-49). Heil et al. further disclose that the catalyst support unit is located downstream of the mixing unit (see Fig. 1).

Regarding claim 14, the limitations recited in the claim are directed to an intended use of the apparatus in claim 1. Accordingly, the claim is rejected for the same reason as in claim 1.

Regarding claims 15 and 16, Heil et al. disclose that the carbon monoxide oxidizer of their invention comprises an oxidant gas introducing passage formed inside the reactor module, which is also used as the alternative static mixing structure, with only the catalyst coating being omitted (col. 6, lines 39-51). Heil et al. further disclose that the oxidant gas introducing passage is formed in at least one of the plates that form the static mixing structure (see fig. 2).

***Allowable Subject Matter***

4. Claims 17-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The above claim would be allowable because the prior art of record fails to disclose or render obvious the carbon monoxide oxidizer comprising an oxidant gas supply unit comprising an orifice that reduces a cross-sectional area of a flow of reformat gas and wherein a chamber having a larger cross-sectional area than the cross sectional area of the orifice is provided in the mixing unit.

***Conclusion***

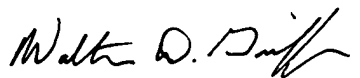
5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Brauchel et al. (US 7,090,807 or PCT pub. No. WO99/29621) disclose a carbon monoxide oxidizer comprising a mixing unit that mixes at least two kind of gases comprising a stacked body of a plurality of plates, the stacked body comprising a rotating passage formed by a through hole formed in each of the plates (see Figs. 2-7). Hemker (US 3,856,270) discloses a static fluid mixing apparatus which includes a series of perforated plates stacked together to divide and sub-divide a stream of fluid and then recombine the same during its passage relative to the plates. Dugan (US 5,843,385) discloses a plate type chemical reactor wherein the reactor contains both static mixing means and heat exchange means.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lessanework T. Seifu whose telephone number is 571-270-3153. The examiner can normally be reached on Mon-Thr 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS

  
WALTER D. GRIFFIN  
SUPERVISORY PATENT EXAMINER